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72

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54

ADAPTIVE ENERGY MANAGEMENT SYSTEM AND METHOD BASED ON THE USE OF TOKENIZED ENERGY PROFILES (TOE)

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Adaptive energy management system and method based on tokenized energy profiles (TEP) in a distribution network, comprising a data ingestion module configured to acquire, aggregate and encrypt structured and unstructured data in real time; a real-time intelligent analysis module based on neural networks and configured to detect patterns of energy consumption and generation, to classify these patterns by generating energy footprints associated with one or multiple users, to predict consumption or generation values and to obtain optimization actions in real time; an automated control and activation module configured to control elements of electricity generation and consumption using model-based predictive control (MPC) techniques and fuzzy algorithms; and a security module configured to encrypt communications using encryption techniques, role-based access control (RBAC), blockchain storage, and real-time monitoring of anomalies.